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EFFECTS OF REINFORCEMENT HISTORY AND INSTRUCTIONS ON THE PERSISTENCE OF STUDENT ENGAGEMENT

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We examined the effects of three reinforcement histories on the persistence of task engagement by 2 fourth-grade students using a partially counterbalanced ABCDBCD design. In each condition, an experimenter made four student contacts during the first 2 min of each session (reinforcement baseline), followed by an 8-min extinction period. The reinforcement history that contained an instructional control component produced the greatest persistence in student engagement. The applied relevance of instructional control is discussed.

DESCRIPTORS: instructional control, reinforcement history, resistance to extinction, task engagement

Researchers have known for some time that children's classroom behavior can be improved by reinforcing task engagement consistent with stated classroom rules (e.g., Madsen, Becker, & Thomas, 1968). Less is known, however, about how to make student engagement more *persistent* when reinforcement is reduced or discontinued. One approach to increasing the persistence of behavior that has been examined in laboratory research is known as *instructional control* (Hayes, Brownstein, Haas, & Greenway, 1986). Instructional control develops when individuals are given instructions that correspond to the response–reinforcer contingencies in effect (DeGrandpre & Buskist, 1991). Our goal in the present study was to examine the effects of three reinforcement histories, one of which contained an instructional control component, on the persistence of student engagement. Reinforcement history was manipulated as different sets of four experimenter–student contacts delivered during the first 2 min of each session (i.e., reinforcement baselines). Persistence was measured as the percentage of task engagement during consecutive 1-min intervals of an 8-min extinction period, expressed as a proportion of responding during the reinforcement baseline.

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METHOD

Participants and Setting

Participants were 2 fourth-grade male students, Trevor (age 10) and Roger (age 9), from the same combined third- and fourth-grade classroom. Both students were described by their teacher as being off task for the majority of time during independent seat work. Two 10-min sessions were conducted per day in the classroom while the students worked at their desks completing one spelling assignment, one worksheet, and one grammar assignment.

Target Behavior and Observational Procedure

Student engagement was recorded using 10-s momentary time sampling and was defined as the child being actively involved in completing an assigned task and oriented toward work materials. Two undergraduate and two graduate students collected the ob-

Table 1
Mean Percentages of Engagement During Reinforcement Baseline and Extinction Periods Across Conditions

Condition	Roger		Trevor	
	Reinforcement baseline	Extinction	Reinforcement baseline	Extinction
No-reinforcement baseline	56.3	56.3	16.7	27.4
Praise and redirect	89.2	81.3	89.6	90.5
Praise only	79.1	71.9	87.5	76.9
Praise and positive attention	80.9	62.8	91.6	61.4

servational data at the same time each morning.

Experimental Design and Procedure

In each condition, four experimenter–student contacts were delivered on a fixed-interval (FI) 30-s schedule during the first 2 min of a session followed by an 8-min extinction period. The same sequence of contacts was implemented in each of the two daily sessions. The three sequences were compared using a partially counterbalanced ABCDBCD design beginning with the praise-only condition to preliminarily assess the potency of praise as a reinforcer.

Baseline. During baseline, the teacher and the teaching assistant were instructed to conduct class in their usual manner and student engagement was recorded by the observers. The experimenter was not present in the room during the baseline phase.

Praise-only (P-O) sequence. In the P-O condition, students received four consecutive praise statements (e.g., "You're working hard; good job!") contingent on task engagement. Other than the contacts prescribed by a checklist given to the experimenter, no other interactions occurred between the students and the experimenter, the teacher, or the teaching assistant.

Praise-redirect (P-R) sequence. During this condition, students were praised for task engagement during the first and third 30-s intervals, but were given a redirection statement (e.g., "Please stop talking and work on your assignment") during the second and fourth 30-s intervals. Redirections were given at some point during the specified interval contingent on off-task behavior. By providing students with instructions about how to behave and with reinforcement for following those instructions, this phase constituted the instructional control condition.

Praise and positive attention (P-P) sequence. This condition was similar to the P-R procedures except that students were given positive attention ("Sometimes it's good to take a break from work") contingent on off-task behavior during the second and fourth 30-s intervals. This phase was implemented to examine the relative persistence of task engagement when reinforcement occurred in tandem with attention for off-task behavior and in the absence of instructional control.

RESULTS AND DISCUSSION

The experimenter implemented 100% of the prescribed contacts per session during the reinforcement baselines, and interobserver agreement for the recording of student behavior (i.e., agreements divided by agreements plus disagreements multiplied by 100%) averaged 92.9% during 33% of the sessions across all phases of the study (range, 71.7% to 100%). Mean percentages of engagement for both students across all experimental conditions are presented in Table 1. During the no-reinforcement base-

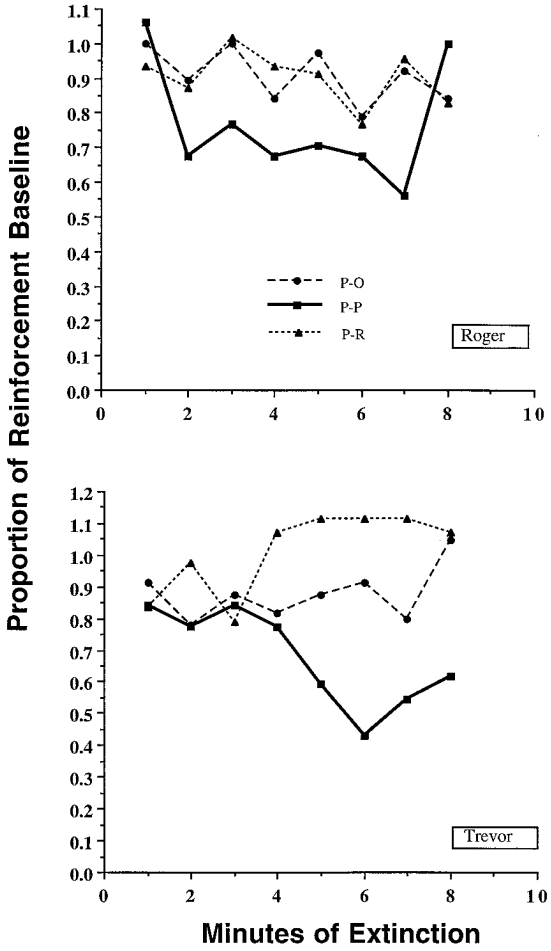

Figure 1. Mean percentages of engagement for Roger and Trevor during consecutive 1-min intervals of extinction. Engagement is expressed as a proportion of the mean level attained during the reinforcement baseline for each condition (P-O = praise only; P-R = praise and redirect; P-P = praise and positive attention).

line, Roger's mean level of engagement was 56.3%, whereas Trevor's was somewhat lower at a mean of 22.1%. With introduction of the P-O sequence, both students showed an increase in engagement during the reinforcement baseline to means of 79.1% (Roger) and 87.5% (Trevor). Mean levels of engagement during the reinforcement baselines remained at comparably high levels across all experimental conditions for Trevor but were higher during the P-R condition for Roger. Both students showed the highest mean levels of engagement during extinction under the P-R condition, followed by the P-O and P-P conditions.

Figure 1 shows the mean percentages of engagement during consecutive 1-min intervals of extinction for each experimental condition, expressed as a proportion of the preceding 2-min reinforcement baselines. Levels of engagement for Roger decreased at similar rates for the P-R and P-O conditions but declined more rapidly for the P-P condition. For Trevor, levels of engagement increased under the P-R condition, remained relatively stable under the P-O condition, and decreased substantially under the P-P condition.

The failure to replicate effects of the P-R condition with Trevor, the absence of reversals in the research design, and the brief extinction periods (i.e., 8 min) limit the conclusions that can be drawn from the present investigation. Nevertheless, the high levels of engagement that were observed during extinction under the P-R and P-O conditions for Roger and under the P-R condition for Trevor support the contention that instructional control, like reinforcer rate and quality, can increase the mass-like aspects of desired classroom behavior. To further examine the persistence-strengthening effects of reinforcement history and instructions on classroom behavior, researchers may wish to establish the functional properties of various experimenter contacts, monitor behavior over longer extinction periods, or provide instructions with varying degrees of congruence to the contingencies in effect.

REFERENCES

DeGrandpre, R. J., & Buskist, W. F. (1991). Effects of accuracy of instructions on human behavior: Correspondence with reinforcement contingencies matters. *The Psychological Record, 41,* 371–384.

Hayes, S. C., Brownstein, A. J., Haas, J. R., & Greenway, D. E. (1986). Instructions, multiple schedules, and extinction: Distinguishing rule-governed from schedule-controlled behavior. *Journal of the Experimental Analysis of Behavior, 46,* 137–147.

Madsen, C. H., Becker, W. C., & Thomas, D. R. (1968). Rules, praise, and ignoring: Elements of elementary classroom control. *Journal of Applied Behavior Analysis, 1,* 139–150.

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